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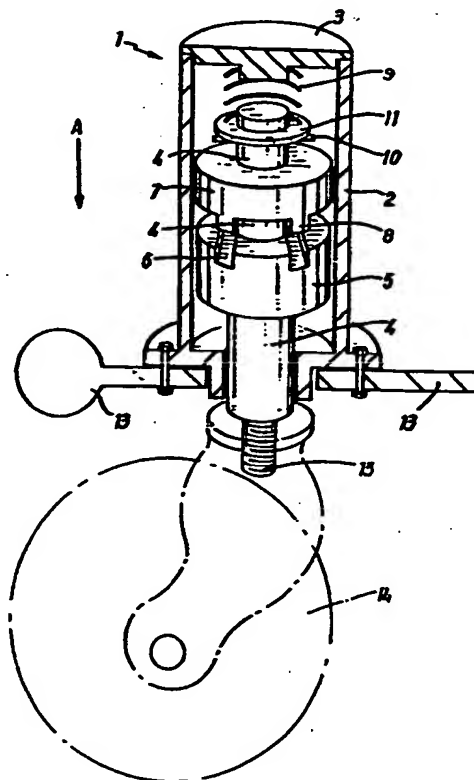
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(54) Title: STEERING UNIT

(57) Abstract

A steering unit (1) for a trolley (12) comprises a first member attached to the chassis (13) of the trolley (12) and a second member attached to a wheel (14) of the trolley (12) and locking means (7) and (5) which lock the second member, and so the wheel (14), in a predetermined position to allow the trolley (12) to be steered with ease.



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1    "Steering Unit"

2

3    This invention relates to a steering unit.

4

5    A number of factors are considered in the design of  
6    shopping trolleys such as: trolley width in relation  
7    to aisle width, trolley stacking ability, normal  
8    ergonomic considerations and overall manoeuvrability.

9    Unfortunately, the vast majority of trolleys do not  
10   manoeuvre with the ease and accuracy required by users.  
11   Even a trolley which, when unladen, functions as the  
12   user requires can become extremely difficult to operate  
13   when heavily laden. This is a particular problem when  
14   a trolley is taken across even the shallowest of  
15   slopes, normally on the way to car parks, where any  
16   sideway movement of the trolley can build in momentum  
17   resulting, in some cases, in the user losing complete  
18   control of the trolley.

19

20   According to the present invention there is provided a  
21   a steering unit for a trolley, comprising first and  
22   second members, said first member adapted to be fixed  
23   on the trolley, said second member attachable to a  
24   wheel of the trolley and connected to said first member  
25   for rotation with respect to said first member, and

1 means provided to lock the two members in a  
2 predetermined position under load.

3  
4 Preferably, said second member is at least partially  
5 rotatable within said first member.

6  
7 Preferably, said predetermined position is determined  
8 by the two members being shaped to interlock in said  
9 predetermined position.

10

11 Preferably, said first member comprises a hollow  
12 casing, attachable at one end to the trolley chassis  
13 and sealed at the other end to form a receptacle for  
14 the second member. Preferably, the casing is sealed  
15 with a releasable cap, the cap enabling access to the  
16 interior of the casing.

17

18 Preferably, said second member comprises a longitudinal  
19 member spring-loaded to bear against the first member  
20 when under load.

21

22 Preferably, the longitudinal member has a flange  
23 mounted upon it, said flange having grooves which are  
24 shaped to fit dogs provided on the receptacle, and so  
25 interlock the first and second members when engaged.

26

27 The longitudinal member may be spring-loaded by a  
28 helical spring attached to the sealed end of the  
29 receptacle and bearing against the longitudinal member.

30

31 Alternatively, the longitudinal member may be  
32 spring-loaded by a disc spring or a series of disc  
33 springs attached to the sealed end of the receptacle  
34 and bearing against the longitudinal member.

35

1 Most preferably, the position of the second member,  
2 once interlocked with the first member, ensures that  
3 the wheel to which the second member is attached is  
4 directed to run in a forward direction.

5  
6 The trolley on which the steering unit is used may also  
7 have a shaped handle which extends across the rear of  
8 the trolley in a continuous curve and is positioned at  
9 an angle and distance that allows the standard stacking  
10 of such trolleys.

11  
12 Preferably, an external force of approximately ten  
13 pounds is sufficient to overcome the repulsive force of  
14 the spring and cause the locking mechanism to contact  
15 the locating barrel.

16  
17 An embodiment of the present invention will now be  
18 described, by way of example, with reference to the  
19 accompanying drawings in which:-

20  
21 Fig. 1 is a perspective view of a steering  
22 unit in accordance with the present invention,  
23 attached to a trolley wheel;  
24 Fig. 2 is a side view of the integral piston  
25 rod and locating barrel and the locking  
26 mechanism of the steering unit of Fig. 1;  
27 Fig. 3 is a side view of a unidirectional  
28 piston rod and locating barrel and the locking  
29 mechanism of the steering unit of Fig. 1; and  
30 Fig. 4 is a perspective view of a trolley with  
31 steering units of the present invention attached.

32  
33 A steering unit 1 comprises a first member in the form  
34 of a casing 2, releasable cap 3, a second member  
35 provided as a longitudinal member in the form of a

1 centrally mounted piston rod 4 housed within the casing  
2 2, and locking means provided as a flange 5 with  
3 grooves 6, which may be interlocked with a collar 7  
4 that has dogs 8 provided for this purpose.

5  
6 A repulsive force in direction A is generated by a  
7 spring 9 located at the top of the piston rod 4. The  
8 piston rod 4 is secured in position above the collar 7  
9 by a locking pin 10. The collar 7 is fixed to the  
10 casing 2.

11  
12 A washer 11 is located above the locking pin 10, and  
13 the spring 9 acts between the washer 11 and the cap 3  
14 attached to the top of the casing 2.

15  
16 The spring 9 is shown in Fig. 1 as a coil spring, but  
17 this may be replaced by a disc spring or stack of disc  
18 springs which can fulfil the same function but reduces  
19 the overall length.

20  
21 When in use, the casing 2 is bolted to the front of a  
22 shopping trolley 12 on its chassis 13, and a front  
23 wheel 14 of the trolley 12 is attached to a threaded  
24 section 15 at the base of the piston rod 4.

25  
26 The trolley wheel 14 will swivel as normal when the  
27 trolley 12 is empty. However, when the weight of the  
28 load in the trolley 12 overcomes a predetermined value  
29 the force produced by the load will exceed the  
30 repulsive force produced by the spring 9 and the  
31 chassis 13 of the trolley 12 will lower, thus lowering  
32 the collar 7 onto the flange 5. This can occur  
33 irrespective of the position of the wheel 14 and  
34 consequent position of the attached flange 5, but when  
35 the wheel 14 is located in the forward or backward

1 direction, dogs 8 on the collar 7 and grooves 6 in the  
2 flange 5 will be aligned and mate, thus locking the  
3 flange 5 in position and locking the wheel 14 in a  
4 position to roll forwards or backwards.

5  
6 The symmetrical dog 8 and groove 6 arrangement  
7 illustrated in Fig. 2 enables the wheel 14 to be locked  
8 in a forward or a backward direction with respect to  
9 the trolley chassis 13, separated by  $180^{\circ}$ , whereas the  
10 asymmetric positioning of the dogs 8 and grooves 6  
11 illustrated in Fig. 3 enables the wheel 14 to be locked  
12 only in the forward travel direction, with respect to  
13 the trolley chassis 13, where the majority of the wheel  
14 14 is positioned behind the piston rod 4.

15  
16 Thus the trolley 12 will be compelled to move forward,  
17 under a user's direction, and will not move at a  
18 tangent under the laden trolley's own momentum, even  
19 when traversing very steep slopes.

20  
21 Two steering units 1 are shown attached to the chassis  
22 13 of a trolley 12 in Fig. 4. The trolley 12 has a  
23 handle 16 which is a continuous curve. The distance to  
24 which the handle 16 extends from the body of the  
25 trolley is limited to a size suitable to allow stacking  
26 of such trolleys end-to-end in the usual linear  
27 fashion.

28  
29 When loaded, the weight of the trolley 12 bears upon  
30 the steering unit 1 and the wheels 14 swivel with the  
31 piston rod 4, until the grooves 6 engage the dogs 8 to  
32 fix the wheels 14 in a forward position.

33  
34 The locked wheel 14 will not deviate from the desired  
35 direction by more than one degree. However, should the

1 user wish to release the locked wheel 14, this can be  
2 accomplished simply by raising the front of the trolley  
3 12 or pressing down on the trolley handle 16 which is  
4 to the rear of the chassis 8, so that the front of the  
5 trolley 12 is raised slightly, thus separating the  
6 collar 7 and flange 5. Similarly, the wheels 14 unlock  
7 when the front of the laden trolley 12 is "snatched"  
8 sideways.

9  
10 The steering unit 1 may be manufactured in any suitable  
11 material such as metals or plastics or any combination  
12 of these as desired.

13  
14 The operating handle 16 of the trolley 12 with the  
15 steering unit 1 attached is curved to aid steering of  
16 the trolley and is more comfortable to use by being  
17 ergonomically suitable.

18  
19 Modifications and improvements may be incorporated  
20 without departing from the scope of the invention.

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## 1 CLAIMS:

2

3 1. A steering unit for a trolley, comprising first and  
4 second members, said first member adapted to be fixed  
5 on the trolley, said second member attachable to a  
6 wheel of the trolley and connected to said first member  
7 for rotation with respect to said first member, and  
8 means provided to lock the two members in a  
9 predetermined position under load.

10

11 2. A steering unit for a trolley as claimed in Claim  
12 1, wherein said second member is at least partially  
13 rotatable within said first member.

14

15 3. A steering unit for a trolley as claimed in Claims  
16 1 or 2, wherein said predetermined position is  
17 determined by the two members being shaped to interlock  
18 in said predetermined position.

19

20 4. A steering unit for a trolley as claimed in any one  
21 of Claims 1 to 3, wherein said first member comprises a  
22 hollow casing, attachable at one end to the trolley  
23 chassis and sealed at the other end to form a  
24 receptacle for the second member.

25

26 5. A steering unit for a trolley as claimed in Claims  
27 1 to 4, wherein said second member comprises a  
28 longitudinal member spring-loaded to bear against the  
29 first member when under load.

30

31 6. A steering unit for a trolley as claimed in Claim  
32 5, wherein the longitudinal member has a flange mounted  
33 upon it, said flange having grooves which are shaped to  
34 fit dogs provided on the receptacle, and so interlock  
35 the first and second members when engaged.

1 7. A steering unit for a trolley as claimed in Claim  
2 5, wherein the longitudinal member is spring-loaded by  
3 a helical spring attached to the sealed end of the  
4 receptacle and bearing against the longitudinal member.

5  
6 8. A steering unit for a trolley as claimed in Claim  
7 5, wherein the longitudinal member is spring-loaded by  
8 a disc spring attached to the sealed end of the  
9 receptacle and bearing against the longitudinal member.

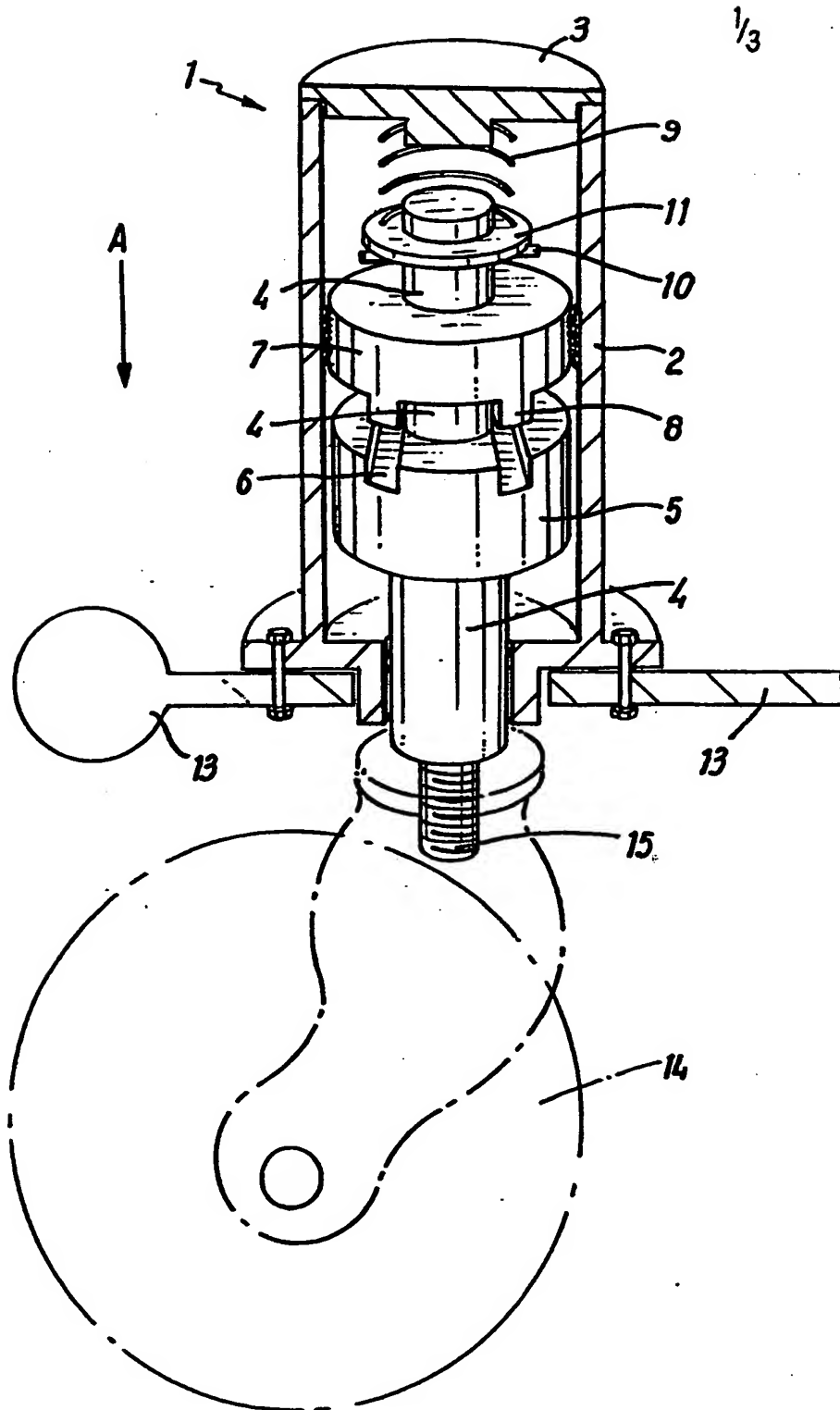
10  
11 9. A steering unit for a trolley as claimed in any one  
12 of Claims 4 to 8, wherein the casing is sealed by a  
13 releasable cap to provide access to the interior of the  
14 casing.

15  
16 10. A steering unit for a trolley as claimed in any  
17 preceding Claim, wherein the position of the second  
18 member, once interlocked with the first member, ensures  
19 that the wheel to which the second member is attached  
20 is directed to run in a forward direction.

21  
22 11. A trolley comprising a chassis and handle and front  
23 wheels each having a steering unit as defined in any  
24 preceding Claim.

25  
26 12. A trolley as claimed in Claim 10, wherein the  
27 handle extends across the rear of the trolley in a  
28 continuous curve and is positioned at an angle and  
29 distance which allows the standard stacking of such  
30 trolleys.

31  
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35



**Fig. 1**

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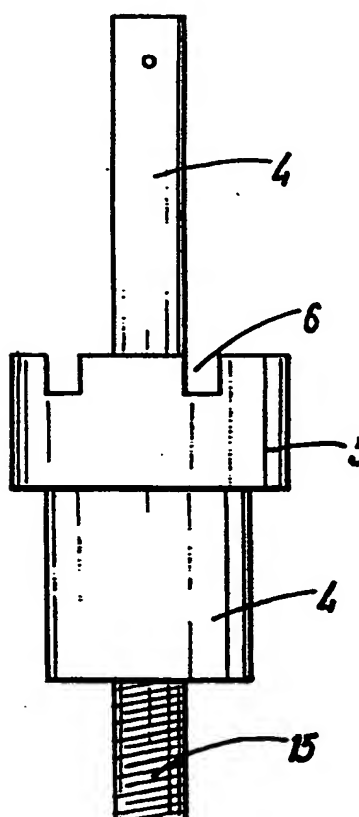
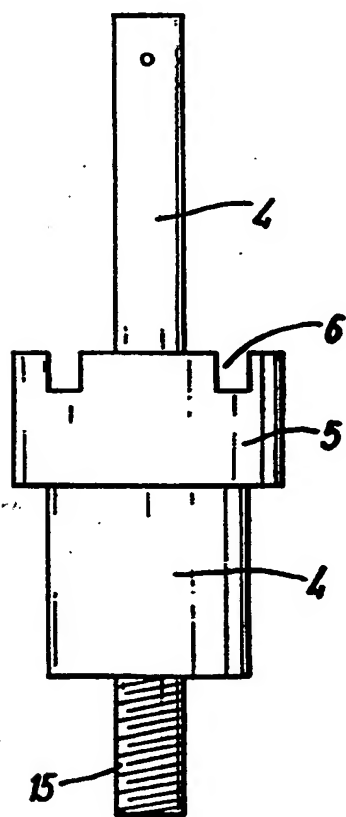
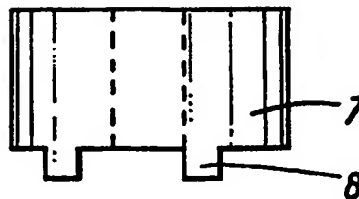
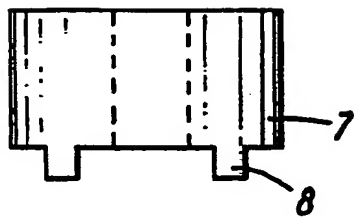


Fig. 2

Fig. 3

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**FIG. 4**

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 90/01580

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (If several classification symbols apply, indicate all) <sup>6</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int.Cl. 5      B60B33/02		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>7</sup>		
Classification System	Classification Symbols	
Int.Cl. 5	B60B ;      B62B	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>8</sup>		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b>		
Category <sup>10</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claims No. <sup>13</sup>
A	DE,A,2847957 (WANZL) 22 May 1980 see page 6, lines 4 - 20 see page 8, lines 1 - 30; figure 1	1, 6, 10
A	US,A,1861919 (HILL) 07 June 1932 see page 1, line 91 - page 2, line 39; figures 1-4	1
A	US,A,4731899 (HUANG) 22 March 1988 see column 3, lines 1 - 38; figures 1-5	1
A	FR,A,2580551 (BLAIN) 24 October 1986 see page 2, line 25 - page 3, line 32; figures 1-3	1
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04 FEBRUARY 1991	13 FEB 1991	
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**ANNEX TO THE INTERNATIONAL SEARCH REPORT  
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**04/02/91**

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DE-A-2847957	22-05-80	None	
US-A-1861919		None	
US-A-4731899	22-03-88	None	
FR-A-2580551	24-10-86	None	